Digital View™

{ Analog-to-Digital Engine Monitoring }

Installation and User Manual

Version 1.0

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Declarations and Conformance

This equipment is intended for use in international waters as well as coastal sea areas administered by countries USA.

In case of any queries, contact customer service at corey@sbmar.com or 805-382-6287.

Preface

About this document

This document provides the information required to install, configure, and use the SMX DigitalView digital display.

The DigitalView manual is structured into two chapters, a glossary of terms and definitions, and an index of key words.

Chapter 1 provides contextual description of the DigitalView installation and configuration procedure.

Chapter 2 provides monitor description and steps to use DigitalView interfaces to monitor various engine and fuel parameters, and manage alarms.

Document Conventions

Convention	Description
Bold	User Interface terms appear in boldface font.
Note	Note appears with the symbol and borders above and below the text.
Warning	Warning appears with the symbol and borders above and below the text.

Revision History

Revision Number	Date
1.0	March 2014

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Chapter 1

DigitalView Installation and Configuration

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1 Introduction

The SMX Engine Gateway Monitor (DigitalView) is a 3.5” display with integrated input and output features.

Figure 1: SMX DigitalView Console

The SMX DigitalView monitors information available over a NMEA 2000, J1939 or information sent from an Analog engine. DigitalView is a part of the new-generation product suite of compact, highly flexible, and rugged CANbus displays.

Features of SMX DigitalView:

- Compatible with N2K (NMEA 2000), J1939, and non-electronic engine types with or without an Engine Control Unit (ECU).
- Acts as an Analogue to NMEA2000 and J1939 to NMEA2000 digital gateway to allow engine data to be retransmitted to other NMEA2000 devices.
- Graphical display of primary engine parameters derived from traditional Analog engine senders, NMEA 2000, or J1939 networks.
- Primary display options include parameters related to engine status, alarms, fuel level, rudder angle, tilt and trim, depth, speed, and heading.
- Displays depth, heading, Speed Over Ground (SOG), and speed over water as available on NMEA2000.
- ISO and SAE standard icons and test-based multi-language menu.
- Data is available in multiple formats and measurement units.

- Output is included for driving an external alarm.

SMX DigitalView is driven by CANvu software that provides selectable icon-based display layouts. CANvu software includes a comprehensive multi-language text-based fault warning and acknowledgement system, and a series of “hidden until lit” alarms.

To allow multifunctionality and increased input or output capability, SMX DigitalView offers seven Analog inputs, one digital input, and four outputs – one RS232, two CANbus 2.0B, and a USB 2.0.

The completely sealed SMX DigitalView with 320(H) × 240(V) QVGA resolution is fully sunlight viewable and electrically and environmentally rugged; it provides tough, flexible, and maintenance-free instrumentation in all types of environmental conditions. The DigitalView unit is waterproof and has built-in day and night modes for comfortable monitoring in all types of visibility and weather conditions.

SMX DigitalView supports three engine types:

- NMEA 2000
- J1939
- Non-electronic

Each DigitalView display can be allocated to the port (or single), starboard, and/or the center engines, and when connected, displays multiple functional data parameters of an engine. The SMX DigitalView interface offers four switchable gauge display screens and one fuel management screen to enable easy and real-time monitoring of engine performance.

1.1 Input or Output Compatibility

1.1.1 J1939

J1939 is the engine data protocol that runs over the industrial CANbus that is used to exchange data between two engines. It is used to synchronize RPMs on a twin-engine vessel or to drive physical gauges.

1.1.2 NMEA 2000

National Marine Electronics Association (NMEA) 2000 is the standard for serial data networking of marine electronic devices. It is the plug and play communication standard that is used to connect marine sensors and display units within ships and boats. Communication takes place at the speed of 250 kilobits per second, allowing any sensor to communicate with any display unit or other devices.

DigitalView converts, displays, and retransmits NMEA2000 engine data measured from traditional Analog engine sender signals or from J1939 / NMEA2000.

DigitalView as an Analog to NMEA2000 “gateway,” replaces the need for expensive dedicated converter modules. It provides the user a full-color interactive engine monitor screen that can be used instead of or along with the traditional gauges.

1.2 Product Specification

Hardware	
Micro Controller Unit	Processor is Free scale iMX 286 at 454 MHz
FLASH Memory	128 MB
Electrical	
Display	a-Si TFT LCD 3.5”
Resolution	320(H) × 240(V) QVGA
Active Area	70.08 mm(H) × 52.56 mm(V)
Viewing Angle	130/110 degrees from 6 O’clock
Number of Colors	64 K
Contrast Ratio	300 : 1
Brightness	750 NIT (cd/m2) Full sunlight readable
Power Requirement	10 V to 32 V DC
Sounder	Internal Buzzer
Connection	Two 12 Pin Deutsch DT04-12P Molded in receptacle
Communication	RS232, (2) CAN BUS 2.0B, USB 2.0
Environmental	
Operating Temperature	-20^0 C to $+70^0$ C
Storage Temperature	-30^0 C to $+80^0$ C
Degree of Protection	IP 67

Mechanical	
Case Material	ABS
Case Color	Anthracite Grey
Dimensions	95 mm(W) × 95 mm(H) × 23 mm rear(D)

1.3 Dimensions

Front View

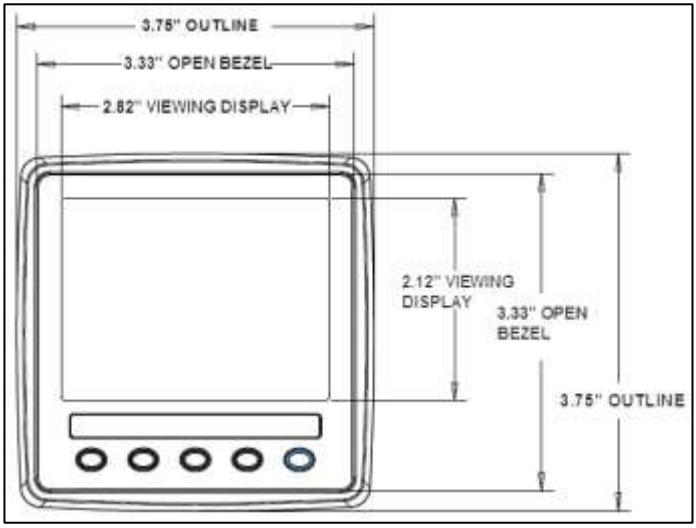

Figure 2: DigitalView Front View

Side View

Figure 3: DigitalView Side View

Rear View

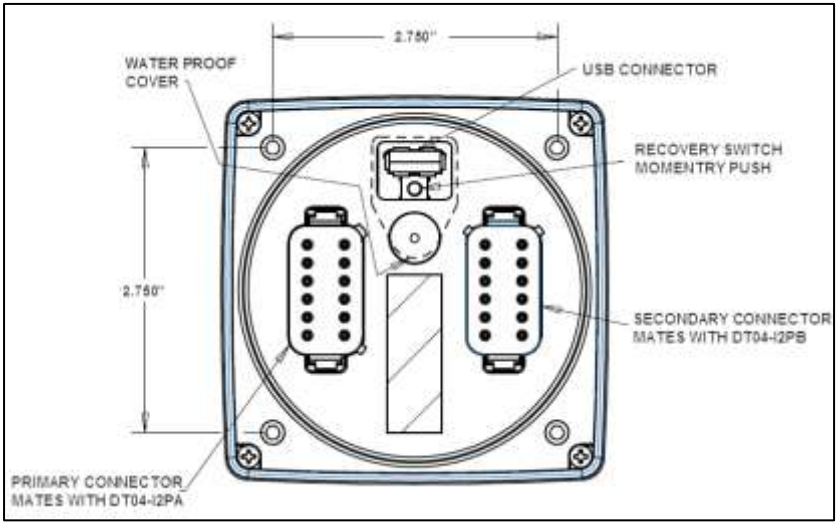

Figure 4: DigitalView Rear View

Primary Connector

Figure 5: Connector PIN OUT

Pin	Wire Color	Signal	Signal Description
1	Black	GND	GROUND
2	Red	PWR	POWER (10 V DC – 30 V DC). Must be protected by 500 MA circuit breaker/fuse.
3	Brown	RLA1	RELAY/SOLENOID OUTPUT 1 (External Alarm)
4	Blue/White	RLA2	RELAY/SOLENOID OUTPUT 2 (Optional gauge light switch)
5	Black	CAN2(–)	ISOLATED CAN SUPPLY (–)
6	Red	CAN2(+)	ISOLATED CAN SUPPLY (+)
7	White	CAN2H	ISOLATED CAN DATA H
8	Blue	CAN2L	ISOLATED CAN DATA L
11	Green	CAN1L	PRIMARY CAN DATA L
12	Yellow	CAN1H	PRIMARY CAN DATA H

Pin 5, Pin 6, Pin 7, and Pin 8 together form a DeviceNet CAN cable. The DeviceNet CAN cable is used to receive or transmit the NMEA2000 data.

Pin 11 (Green wire) and Pin 12 (Yellow wire) is a twisted pair, used for the J1939 input.

Secondary Connector

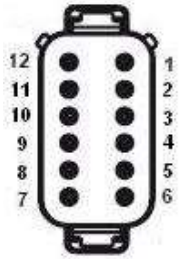

Figure 6: Connector PIN OUT

Pin	Wire Color	Signal	Signal Description
1	Blue	AN1	SENSOR 1 ANALOG INPUT Oil Pressure
2	Brown	AN2	SENSOR 2 ANALOG INPUT Coolant Temp
3	Pink/Black	AN3	SENSOR 3 ANALOG INPUT Boost Pressure
4	Orange	AN4	SENSOR 4 ANALOG INPUT Tilt and Trim.
5	White	AN5	SENSOR 5 ANALOG INPUT Gear Pressure
6	Yellow/White	AN6	SENSOR 6 ANALOG INPUT Rudder Angle
7	Pink/Black	AN7	SENSOR 7 ANALOG INPUT Gear Temp
10	Gray	TACH	TACHOMETER INPUT Connect to Tachometer Input.
11	Green	RS32RX	RS232 RECEIVE GPS NMEA Tx Input.

2 Getting Started

2.1 In the Box

The SMX DigitalView box contains the following items:

- SMX DigitalView
- Harness
- Fitting kit
- Fixing or mounting template
- DigitalView installation and user manual
- Suncover with SMX DigitalView logo

If any of the listed items is found missing or damaged, contact SMX Electronics and Marine LLC at corey@sbmar.com or 805-382-6287.

2.2 Precautions

Follow these safety precautions before installing SMX DigitalView:

- Ensure that all electrical wires are dressed away from moving or hot engine components.
- Protect the wires or cables running through the drilled holes using grommets and by deburring the holes.
- Disconnect the battery before making any electrical connections.
- Reconnect the battery only after you have checked and ensured proper electrical connections.
- Ensure that the power supply to operate DigitalView is 10 V to 32 V DC.

3 Installation and Configuration

3.1 Choosing the Mounting Location

- Choose the installation type – Flush mount dash installation or through the dash installation (standard).
- Choose an appropriate location on the dashboard or a suitable place on the bridge to mount the DigitalView display unit.
- The chosen mounting location must allow the operator to easily control the display and clearly view the display screen.
- Ensure that there is a direct path to run all the connecting cables or harness.

3.2 Mounting Template

SMX DigitalView mounting templates for “Flush Mount Dash Installation” and the “Standard through the Dash Installation” are provided along with the DigitalView display kit. The mounting template is used to position, mark, and drill holes on the dashboard to fit the DigitalView unit.

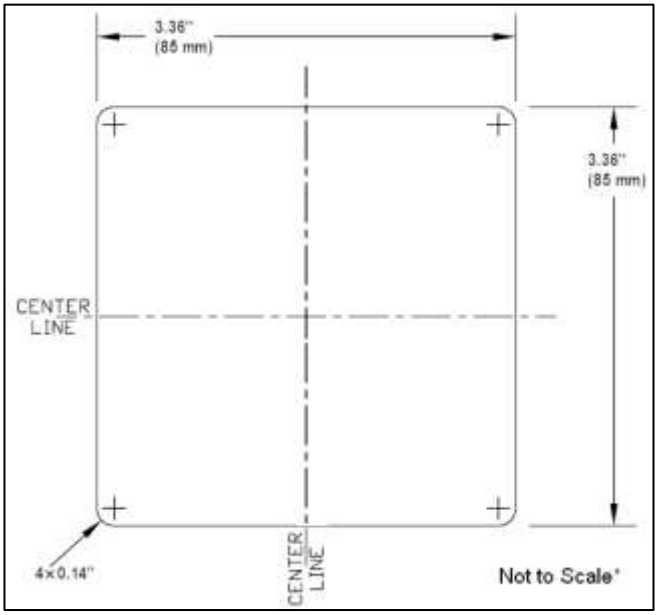

Figure 7: Mounting Template for Flush Mount Dash Installation

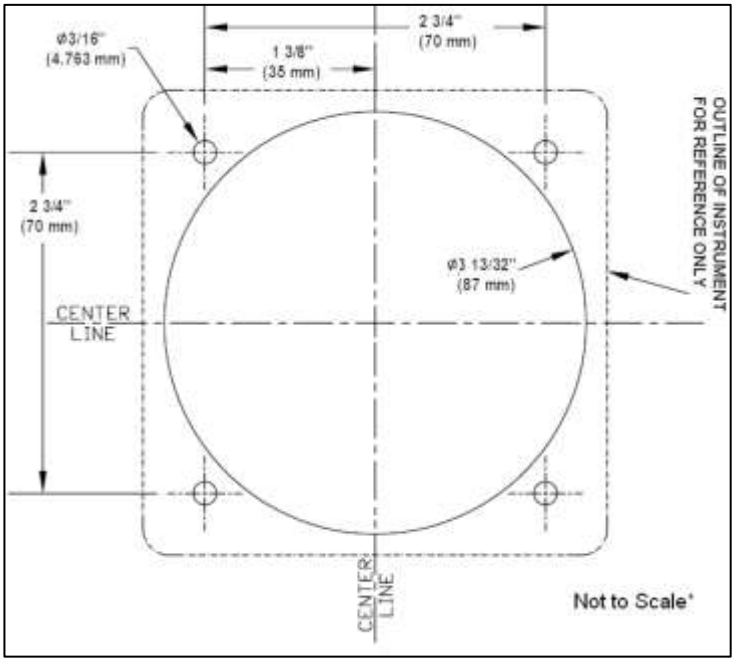

Figure 8: Mounting Template for Through the Dash Installation

DO NOT use the template illustrated in Figure 7 and Figure 8 for installation of your DigitalView.

Use the mounting template provided with the DigitalView display kit.

3.3 Mounting DigitalView

To mount the DigitalView display:

1. Choose and attach the appropriate mounting template to the chosen location using adhesive tape.
2. Mark drilling holes in the dashboard using the mounting template as a guide.
3. Drill holes using a 3/16” or 4.763 mm drill bit.

Before proceeding to the next step of fixing studding, ensure that the rubber seal on the rear of DigitalView display is securely in place over the USB port access.

4. Fix the studding (provided in the fitting kit) into the four positions at the rear of DigitalView display.
5. Feed the studding through the four holes drilled on the dashboard.
6. Fix and hand tighten the nuts to the studding to secure the display in its position.
7. Integrated rubber gasket will seal the display to the dashboard.

3.4 Power Connection

- Power the DigitalView display by connecting it to the engine battery. If the DigitalView display cuts out due to engine cranking, then connect the display to domestic battery.
- Use Black with Red band wire of the harness for the power connection.

There are two Black wires, any one of these wires can be used for power connection.

An inline fuse rated at 500 mA or 1A (max) must be provided to protect the wiring and the display.

3.5 Data Input Connections

3.5.1 Connecting to NMEA 2000 (Optional)

Before connecting the display to the NMEA 2000, check if an NMEA 2000 backbone is fitted on the vessel.

1. Connect the NMEA 2000 DeviceNet cable from the display to the backbone using the T-fitting.
2. Check if the NMEA backbone is terminated properly. This is done by finding each end and ensuring that there is an NMEA 2000 termination device at each end of the backbone.
3. Connect the NMEA 2000 termination device at each end of the backbone if it is not found to be connected at each end of the backbone.

4. If there is a dual station system, connect the system to the NMEA 2000 to share the data between DigitalViews. (Carry out this step even if you do not have any other NMEA 2000 equipment).

3.5.2 Connecting to J1939 Engines (CANbus)

1. Identify the CAN-Low and the CAN-High from the engine ECU (Refer engine manual for more information).
2. Connect the Green wire to the CAN-Low.
3. Connect the Yellow wire to the CAN-High.

Both the Green and Yellow wires must remain twisted together

4. Check if the J1939 CAN is properly terminated by measuring the resistance between CAN-High and CAN-Low.

CAN termination resistance must be between 90 ohm and 150 ohm. If the measured resistance is not within the range, add a 120 Ohm resistor between the CAN-High and the CAN-Low.

3.5.3 Connecting to Non-electronic Engine

When connecting the display to a non-electronic engine, signals from the senders are directly connected to the display harness.

Connect the display to non-electronic engine by making the following connections:

- Connect the oil pressure signal from the sender to the Blue wire.
- Connect the coolant temperature signal from the sender to the Brown wire.
- Connect the boost pressure signal from the sender to the Pink with Black band wire.
- *Connect the oil temperature signal from the sender to the Pink wire.
- Connect the tachometer signal (from W, or R, or AC) to the Gray wire.

A tachometer signal can be drawn from the W terminal of the alternator. If W terminal is unavailable, the signal can be drawn from R or AC terminal of the alternator.
If W, R and AC terminals are unavailable, an alternator shop can install a tap for the tachometer signal.

3.5.4 Connecting to Rudder Angle Sender

Measure the rudder angle from the rudder angle sender by making the following connections:

- Connect the rudder angle signal from the sender to the Yellow with White band wire of the display harness.
- Connect the spare Black wire from the display (used for all Analog senders) to the ground.

3.5.5 Connecting to Fuel Level Sender

Measure the fuel level from the two wire fuel level sender by making the following connections:

- Connect the fuel level signal from the sender to the Blue wire of the display harness.
- Connect the spare Black wire from the display (used for all Analog senders) to the ground.

3.5.6 Connecting to a Trim and Tilt Sender

Measure the tilt trim (one per display) from a standard two wire tilt/trim senders by making the following connections:

- Connect the trim/tilt sender to the Orange wire of the display harness.
- Connect the spare Black wire from the display (used for all Analog senders) to the ground.

3.5.7 Connecting to GPS NMEA 0183 Signal

The NMEA 0183 GPS is connected to the DigitalView display to display SOG and Course Over Ground (COG). Connect the NMEA 0183 to the Green wire of the display harness.

3.6 SMX DigitalView User Interface

Figure 9: DigitalView User Interface

SMX DigitalView provides a robust and user-friendly interface and controls to enable the users to configure, customize, and monitor engine data.

- **Top Gauge** : Display engine speed, SOG, Speed over water
- **Left and Right Gauges**: Display other engine, fuel, and functional parameters
- **Data Box** : Display engine speed, hours, and depth
- **Page Num** : Display number of the DigitalView display page
- **Soft Keys 1 to 5** : Scroll, select, and make various configuration and user's custom settings

3.7 Configuration of System Settings

⚠ System Configuration must be carried out ONLY by the Installation Engineer or an authorized system administrator.

Commission the DigitalView display by configuring the various DigitalView display settings. When the display is powered down, it will save and store the configured settings, ready for quick and easy access when it is turned on again the next time.

To access the system setup main menu and configure settings, press and hold Key5 for approximately five seconds. The Main Menu appears.

The functionality of the respective soft keys is described below.

Key 1	Key 2	Key 3	Key 4	Key 5
To move up to choose a menu option or a submenu	To move down to choose a menu option or a submenu	_	To select a menu option or a submenu and to configure display parameters	To return to the previous menu

3.7.1 Main Menu

The configuration options available in the Main Menu are:

- User Setup
- Alarm Setup
- System Configuration
- About

3.7.1.1 User Setup

Configure the following preferences, display range, and limits in the User Setup screen.

- Language
- Key Tone
- Units
- Max RPM
- Max Speed

Figure 10: User Setup

A. Language

To set the preferred language:

1. Press Key 1 or Key 2 to scroll to the **Language** submenu (highlighted in yellow) in the User Setup menu.
2. Press Key 4 to select **Language**.

   The **Language** options list appears.

3. Press Key 1 or Key 2 to scroll to the preferred language.
4. Press Key 4 to select the preferred language.
5. Press Key 5 to save and return to the **User Setup** menu.

Figure 11: Language Setting

B. Key Tone

To set the key tone:

1. Use Key 1 or Key 2 to scroll to the **Key Tone** submenu (highlighted in yellow) in the **User Setup** menu.
2. Press Key 4 to select **On** or **Off**.

Figure 12: Key Tone Setting

C. Units

To set the measuring units for the engine parameters:

1. Press Key 1 or Key 2 to scroll to the **Units** submenu (highlighted in yellow) in the **User Setup** menu.
2. Press Key 4 to select **Units**.

   The **Units** menu appears.
3. Press Key 1 or Key 2 to scroll to the various engine parameters (Temperature, Volume, and so on).
4. Press Key 4 to select the preferred unit for the selected engine parameter.
5. Press Key 5 to save and return to the **User Setup** menu.

Figure 13: Measuring Units Settings

E. Max RPM and Max Speed

To set the maximum engine RPM and speed display settings:

1. Press Key 1 or Key 2 to scroll to the Max RPM or Max Speed submenu (highlighted in yellow) in the User Setup menu.
2. Press Key 4 to set the maximum reading value.

Figure 14: Max RPM and Max Speed Settings

3.7.1.2 Alarm Setup

Alarms can be enabled and disabled for Analogue, J1939 DM1 and NMEA 2000 inputs.

To enable and disable alarm:

1. Press Key 1 or Key 2 to scroll to the **Alarm Setup** menu (highlighted in yellow) in the **Main Menu**.
2. Press Key 4 to select **Alarm Setup**.

   The **Alarm Setup** screen appears.
3. Press Key 1 or Key 2 to scroll to the **Analogue** or **J1939 DM1** or **NMEA 2000** options.
4. Press Key 4 to toggle and select **Enabled** or **Disabled**.
5. Press Key 5 to save and return to the **Main Menu**.

Figure 15: Alarm Setup

3.7.1.3 System Configuration

The System Configuration menu is used to configure input sources, from where the display will receive information and how it will respond to the information that it receives.

Before configuring the system setting, switch on power to the system and check if all the display(s) power up correctly.

To access the System Configuration menu:

1. Press Key 1 or Key 2 to scroll to the **System Configuration** submenu in the Main Menu (highlighted in yellow).
2. Press Key 4 to select **System Configuration**.

   The System Configuration menu appears.

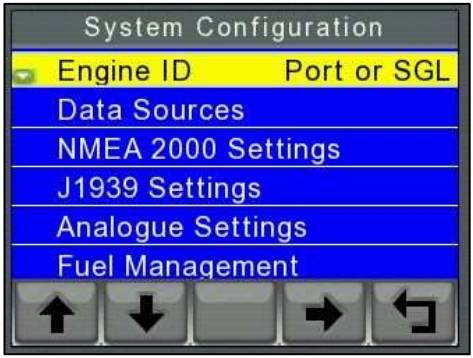

Figure 16: System Configuration Menu

The System Configuration menu contains the following submenus:

- Engine ID
- Data Sources
- NMEA 2000 Settings
- J1939 Settings
- Analogue Settings
- Fuel Management
- Diagnostics
- Restore Defaults

Engine ID

The Engine ID indicates the engine to which the display is connected.

To configure Engine ID:

1. Press Key 1 or Key 2 to scroll to the **Engine ID** submenu in the System Configuration menu.
2. Press Key 4 to select **Engine ID**.
3. Press Key 4 to set the Engine ID to **Port or SGL**, **Starboard**, or **Centre**.

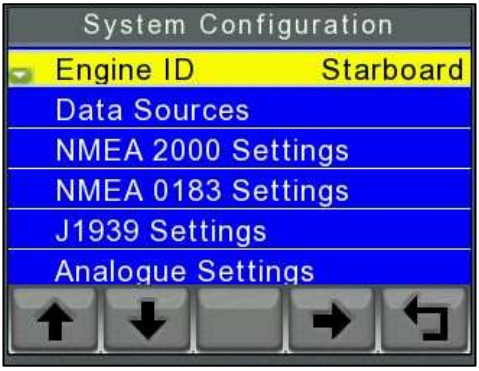

Figure 17: Engine ID Selection

Data Sources

The Data Sources menu enables configuration of the input source, from where the display receives data.

DigitalView can receive input data from any of the following:

- N2K (NMEA 2000)
- J1939
- I/O senders
- N183 (NMEA 0183)
- Demo

All the Data Sources submenu can be configured to Demo and N2K (NMEA 2000) options.
DEMO option will override the actual reading being sent to DigitalView display.

The Data Sources menu contains the following submenus:

- Engine
- Battery
- Fuel
- Speed
- Rudder Angle

To configure Data Sources:

1. Press Key 1 or Key 2 to scroll to the **Data Sources** submenu in the **System Configuration** menu.
2. Press Key 4 to select **Data Sources**.

   The **Data Sources** menu appears.

Figure 18: Data Sources Menu

A. Engine

Configure the following engine parameters in the Engine menu:

- RPM
- Oil temperature
- Oil pressure
- Boost pressure
- Coolant temperature
- Coolant pressure
- Load percentage
- Torque percentage
- Tilt-Trim
- Engine Hours
- Fuel rate
- Fuel pressure

To configure engine input sources:

1. Press Key 1 or Key 2 to scroll to the **Engine** submenu in the Data Sources menu.
2. Press Key 4 to select **Engine**.

   The Engine menu appears.
3. Press Key 1 or Key 2 to scroll to the required submenu option in the Engine menu.
4. Press Key 4 to select the required submenu option (RPM, Oil temperature, etc.).

5. Repeatedly press Key 4 to select and set one of the data input options - **N2K (NMEA 2000), J1939, or I/O**.
6. Press Key 5 to save the setting and return to the Data Sources menu.

Figure 19: Engine

B. Battery

Configure the alternator potential to the different data sources in the Battery menu.

To configure alternator potential settings:

1. Press Key 1 or Key 2 to scroll to the **Battery** submenu in the Data Sources menu.
2. Press Key 4 to select **Battery**.
3. The **Battery** menu appears.
4. Repeatedly press Key 4 to configure the **Alternator Potential** to **N2K (NMEA 2000)**, **I/O**, or **J1939**.
5. Press Key 5 to save and return to the Data Sources menu.

Figure 20: Battery

C. Fuel

To configure **Fuel Level** settings:

1. Press Key 1 or Key 2 to scroll to the **Fuel** submenu in the **Data Sources** menu.
1. Press Key 4 to select **Fuel**.
2. Repeatedly press Key 4 to configure the **Fuel Level** to **N2K (NMEA 2000), I/O, or J1939.**
3. Press Key 5 to save and return to the Data Sources menu.

Figure 21: Fuel Level

D. Speed

Configure the following parameters in the Speed menu:

- Speed
- Water Speed
- Depth
- Heading
- Mag Variation
- Depth Offset
- Course Over Ground

To configure Speed settings:

1. Press Key 1 or Key 2 to scroll to the **Speed** submenu (highlighted in yellow) in the Data Sources menu.

2. Press Key 4 to select **Speed**.
3. Press Key 1 or Key 2 to scroll to the required submenu option in the Engine menu.
4. Press Key 4 to configure the selected submenu to **N2K (NMEA 2000), I/O,** or **J1939**.

The Speed option in the Speed menu can be configured to N2K (NMEA 2000), N183 (NMEA 0183), or J1939.

The Course Over Ground option in the Speed menu can be configured to N183 (NMEA 0183), N2K (NMEA 2000), and Demo.

5. Press Key 5 to save and return to the Data Sources menu.

Figure 22: Speed

E. Rudder Angle

To configure Rudder Angle input:

1. Press Key 1 or Key 2 to scroll to the **Rudder Angle** submenu (highlighted in yellow) in the Data Sources menu.
1. Press Key 4 to select **Rudder Angle**.
2. Press Key 4 to configure Rudder Angle to **N2K (NMEA 2000), I/O,** or **Demo**.
3. Press Key 5 to save and return to the Data Sources menu.

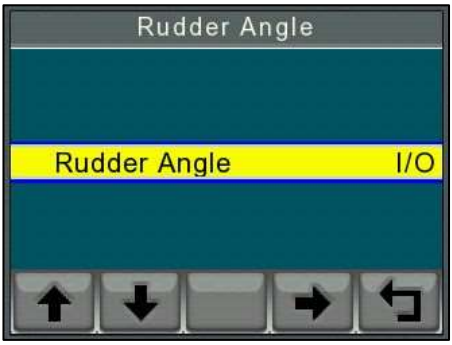

Figure 23: Rudder Angle

NMEA 2000 Settings

Configure the Fluid Level Instance and Gateway in the NMEA 2000 Settings menu.

A. Fluid Level Instance and Gateway

1. Press Key 1 or Key 2 to scroll to the **NMEA 2000 Settings** submenu (highlighted in yellow) in the System Configuration menu.
2. Press Key 4 to select **NMEA 2000 Settings**.

   The NMEA 2000 Settings menu appears.
3. Press Key 1 or Key 2 to scroll to the **Fluid Level Instance** option.
4. Repeatedly press key 4 to configure **Fluid Level Instance** to 1, 2 or 3.
5. Press Key 1 or Key 2 to scroll to the **Gateway** option.
6. Repeatedly press Key 4 to select **Enabled** or **Disabled**.

The Enabled option will transmit all the data, which the display received over the NMEA2000 network.
The Disabled option will not transmit any data over the NMEA2000 network.

7. Press Key 5 to save and return to the System Configuration menu.

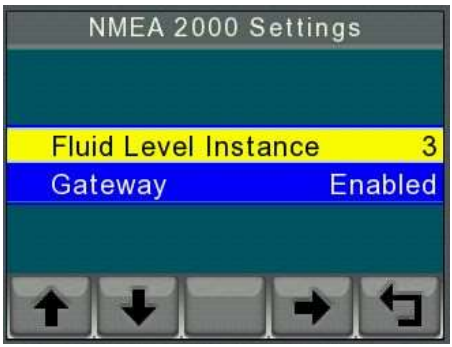

Figure 24: NMEA 2000 Settings

NMEA 0183 Settings

To configure Baud Rate:

1. Press Key 1 or Key 2 to scroll to the **NMEA 0183 Settings** submenu (highlighted in yellow) in the System Configuration menu.
2. Press Key 4 to select **NMEA 0183 Settings**.

   The NMEA 0183 menu appears.
3. Repeatedly press Key 4 to choose and set the appropriate **Baud Rate**.
4. Press Key 5 to save and return to the System Configuration menu.

Figure 25: NMEA 0183

J1939 Settings

The following settings can be configured in the J1939 Settings menu:

- Source Address One: Indicates the source of the J1939 engine.
- Source Address Two: Indicates the source of the transmission.
- DM SPN Version: Indicates the version number.
- Display Address: Indicates the address of the DigitalView display.
- Speed Source: Determines the type of J1939 PGN used to deliver the speed value to the display. It can be set to **Wheel**, or **Nav**.

To configure J1939 settings:

1. Press Key 1 or Key 2 to scroll to the **J1939 Settings** submenu (highlighted in yellow) in the System Configuration menu.
2. Press Key 4 to select **J1939 Settings**.

   The J1939 Settings menu appears.
3. Press Key 1 or Key 2 to scroll to the **required** submenu in the J1939 Settings.
4. Press Key 4 to select the required submenu.
5. Repeatedly Press Key 4 to select a setting.
6. Press Key 5 to save and return to the System Configuration menu.

Configure **Source Address Two** as **GLB** to indicate that the display accepts data from any source.

Configure the **Source Address Two** option only when an alternator is used.

Consult your engine supplier for the appropriate SPN version, if you have problem reading alarm data.

In single engine setup, the default display address is always 40. It is SAE recommendation.

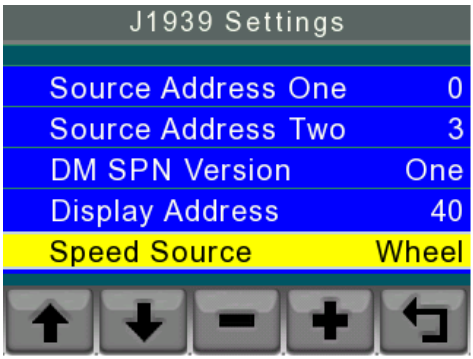

Figure 26: J1939 Settings

Analogue Settings

The following Analog parameters can be configured and set using the Analogue Settings menu:

- RPM Calibration
- Oil Pressure
- Coolant Temp
- Boost Pressure
- Tilt-Trim
- Oil Temp
- Rudder Angel
- Fuel Level

A. RPM Calibration

RPM calibration is a simple multiplier. While the engine is running on idle, adjust the number in brackets to the idle RPM specified in the engine manual.

To configure RPM calibration:

1. Press Key 1 or Key 2 to scroll to **Analogue Settings** (highlighted in yellow) in the System Configuration menu.

   The Analogue Settings menu appears.

2. Press Key 1 or Key 2 to scroll to the **RPM Calibration** option in the Analogue Settings menu.
3. Press Key 4 to select **RPM Calibration**.
4. Repeatedly press Key 4 to set the idle RPM rate.

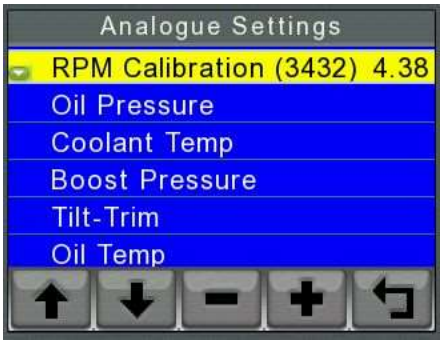

Figure 27: RPM Calibration

B. To Configure other Analogue Settings:

1. Press Key 1 or Key 2 to scroll to the required submenu (highlighted in yellow) in the Analogue Settings menu.
2. Press Key 4 to select a parameter.

   The Analog parameter screen appears.
3. Repeatedly Press key 1 to select the **Calibration** data box or the **Adjust** data box.
4. Press Key 2 or Key 3 to adjust the value in **Calibration** or **Adjust** data box.
5. Press Key 5 to save and return to the Analogue Settings menu.

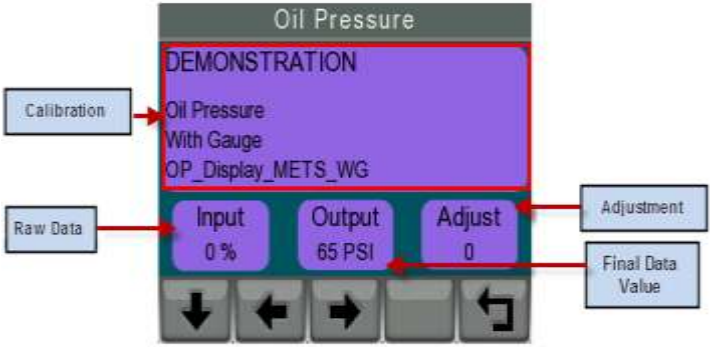

Figure 28: Analogue Settings

Fuel Management

The maximum capacity of the fuel tank (size) can be configured in the **Fuel Management** screen.

To configure the fuel tank size:

1. Press Key 1 or Key 2 to scroll to the **Fuel Management** submenu (highlighted in yellow) in the System Configuration menu.
2. Press Key 4 to select **Fuel Management**.

   The **Fuel Management** menu appears.
3. Repeatedly press Key 4 to set **Tank Size** (in liters).
4. Press Key 5 to save and return to the System Configuration menu.

Figure 29: Fuel Management

Each display can be connected to only one fuel tank. Hence, the display can only read one fuel tank sender.

Diagnostics Menu

The Diagnostics Menu displays the complete information that the DigitalView display is receiving from different networks.

The Diagnostics Menu contains the following submenus:

- CAN Viewer
- UART Viewer
- IO Debug Screen
- Data Viewer
- Frame Counter

To access Diagnostics Menu:

1. Press Key 1 or Key 2 to scroll to the **Diagnostics Menu** (highlighted in yellow) in the System Configuration menu.
2. Press Key 4 to select the **Diagnostics Menu**.

   The Diagnostics menu appears.

Figure 30: Diagnostics Menu

A. CAN Viewer

The CAN Viewer displays the raw CAN data that is received and sent. Both CAN PORT 1 data and CAN PORT 2 data can be viewed in this viewer.

To view raw CAN data:

1. Press Key 1 or Key 2 to scroll to the **CAN Viewer** submenu (highlighted in yellow) in the Diagnostics menu.
2. Press Key 4 to select **CAN Viewer**.

   The CAN Viewer screen appears.

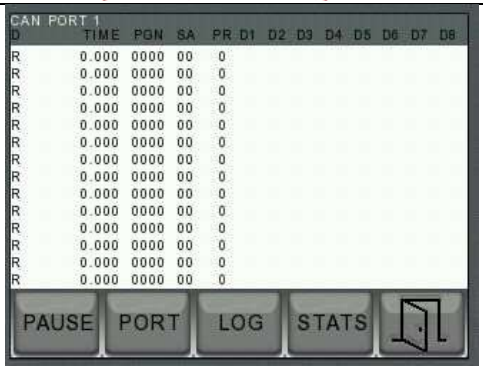

Figure 31: CAN Viewer

3. Press Key 1 to pause data recording.
4. Press Key 2 to change the port (1 or 2), if required.
5. Press Key 3 to select LOG.

   The log screen appears.

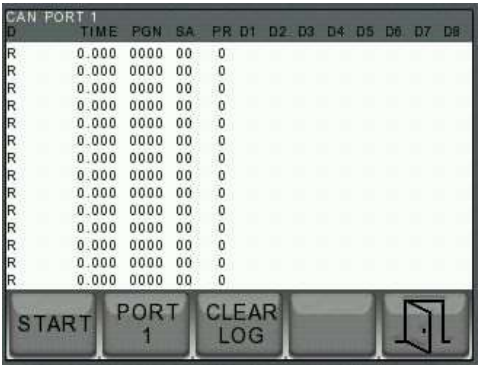

Figure 32: CAN Viewer: Log Screen

6. Press Key 3 to clear the log.
7. Press Key 2 to change the port (1 or 2), if required.
8. Press Key 1 to start recording the CAN data.

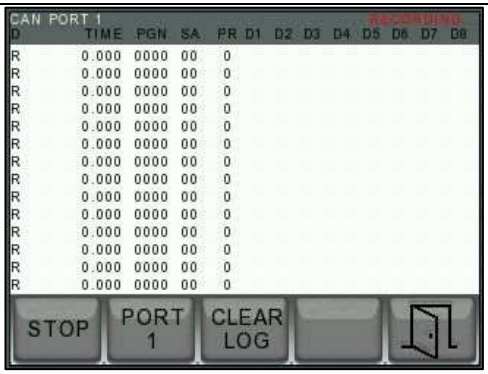

Figure 33: CAN Viewer: Recording Screen

9. Press Key 1 to stop recording.
10. Press Key 5 to save and return to the previous options
11. Press Key 4 to select **STATS**.

    The statistics screen appears.

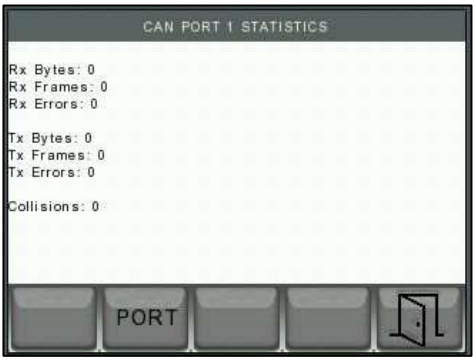

Figure 34: CAN Viewer: Statistics Screen

B. UART Viewer

UART Viewer displays the raw NMEA 0183 data that is being received.

To view NMEA 0183 data in the UART Viewer:

1. Press Key 1 or Key 2 to scroll to the **UART Viewer** submenu (highlighted in yellow) in the Diagnostics menu.
2. Press Key 4 to select **UART Viewer**.

The UART Viewer screen appears.

3. Press Key 5 to save and return to the Diagnostics Menu.

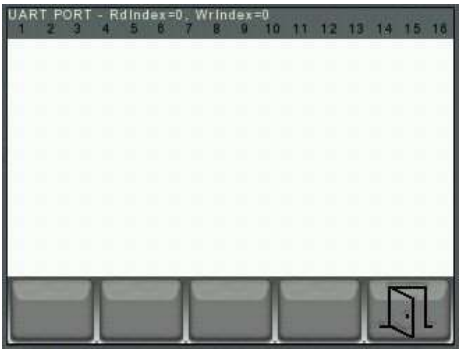

Figure 35: UART Viewer

C. IO Debug Screen

The IO Debug screen displays analog inputs, outputs and digital outputs. You can also check the display for any bugs.
To view analog inputs, outputs and digital outputs:

1. Press Key 1 or Key 2 to scroll to the **IO Debug Screen** submenu (highlighted in yellow) in the Diagnostics menu.
2. Press Key 4 to select IO **Debug Screen**.

   The IO Debug Screen appears.
3. Press Key 1 to view **Analogue Inputs**.
4. Press Key 2 or Key 3 to view the outputs.
5. Press Key 5 to save and return to the Diagnostics Menu.

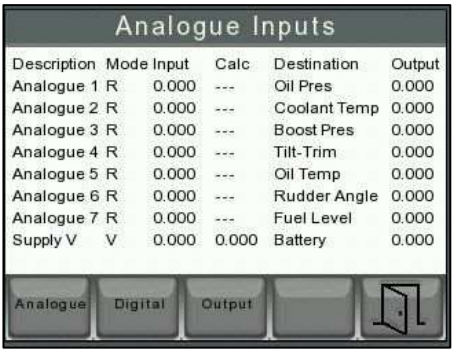
Analogue Inputs
Description Mode Input Calc Destination Output
Analogue 1 R 0.000 --- Oil Pres 0.000
Analogue 2 R 0.000 --- Coolant Temp 0.000
Analogue 3 R 0.000 --- Boost Pres 0.000
Analogue 4 R 0.000 --- Tilt-Trim 0.000
Analogue 5 R 0.000 --- Oil Temp 0.000
Analogue 6 R 0.000 --- Rudder Angle 0.000
Analogue 7 R 0.000 --- Fuel Level 0.000
Supply V V 0.000 0.000 Battery 0.000
Analogue
Digital
Output

Figure 36: IO Debug Screen: Analogue Inputs

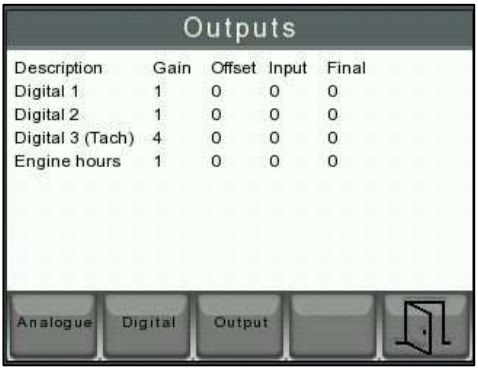

Figure 37: IO Debug Screen: Outputs

D. Data Viewer

The Data Viewer screen displays the data such as Units, source, and Add that the display is reading from networks.

To view data in the Data Viewer:

1. Press Key 1 or Key 2 to scroll to the **Data Viewer** submenu (highlighted in yellow) in the Diagnostics menu.
2. Press Key 4 to select **Data Viewer**.

   The Data Viewer Screen appears.
3. Press Key 1 and Key 2 to scroll up and down the data rows in the Data Viewer screen.
4. Press Key 5 to save and return to the Diagnostics Menu.

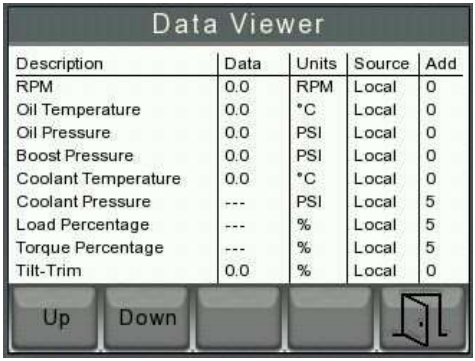

Figure 38: Data Viewer

Restore Defaults

The custom or system specific configuration can be restored to company default settings and to enable re-configuration. Note that all settings except engine hour setting will be restored to their default settings.

To restore company default settings:

1. Press Key 1 or Key 2 to scroll to the **Restore Defaults** submenu (highlighted in yellow) in the System Configuration menu.
2. Press Key 4 to select **Restore Defaults**.

   The **Restore Defaults** screen appears.

Figure 39: Restore Defaults

Chapter 2

User Operation

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4 User Interface

Figure 40: User Interface

Key 1	To select and view a display page
Key 2	To select a gauge (The selection of gauge is indicated by a red rectangular box.)
Key 3	To choose a parameter that will be displayed in the selected gauge on the page
Key 4	To display alarm screen (This is applicable only when an alarm is active)
Key 5	To open the display settings menu – brightness and view modes To access the Main Menu (hold down Key 5 for approximately five seconds)

5 Interface View Settings

SMX DigitalView provides the option to adjust user interface brightness and view modes to suit day and night operational requirements.

A simple user-friendly toolbar facilitates the functionality.

5.1 Adjusting Interface Brightness

To adjust user interface brightness of DigitalView:

1. Press Key 5 to open the interface view settings menu.

   The view settings tool bar appears.

2. Press Key 1 to decrease and key 2 to increase the brightness of the DigitalView display screen.

Figure 41: User Interface View Settings

5.2 Selecting View Modes

To select view modes:

1. Press Key 5 to open the interface view settings menu.

   The view settings tool bar appears.

2. Press Key 3 to set the DigitalView display screen to the day mode.

Figure 42: Day Mode

3. Press Key 4 to set the DigitalView display screen to the night mode.

Figure 43: Night Mode

4. Press Key 5 to save and return to the DigitalView main interface.

6 DigitalView Display Gauges

SMX DigitalView has 4 gauge display pages and 1 fuel management page. The top gauge includes the data box.

Top Gauge

The Top Gauge in the page is to display:

Parameter	Icon
Engine Speed	
Speed over water	
Speed over ground	

The data box displays:

- Engine speed
- Engine hours
- Depth

Bottom Left and Right Gauge

The bottom left and bottom right gauge in the page are to display:

Parameter	Icon
Oil Temperature	
Oil Pressure	
Boost Pressure	

Parameter	Icon
Coolant Temperature	
Coolant Pressure	
Torque Percentage	
Tilt & Trim	
Alternator Potential	
Fuel Pressure	
Fuel Level	
Throttle Percentage	
Rudder Angle	
Fuel Rate	
Depth	
Heading	
Course Over Ground (COG)	
Economy	

Parameter	Icon
Load Percentage	

Fuel Management Screen

The fuel management page data:

- Fuel rate total
- Fuel used total
- Trip fuel used
- Economy
- Fuel level
- Time till 0
- Distance till 0

6.1 Changing the Gauge Display

To change the gauge display or customize parameter gauge display on a view page:

1. Repeatedly press Key 1 to select a view page on DigitalView.
2. Press Key 2 to select a parameter gauge.
3. Press Key 3 to change the gauge data to the currently available data.

Figure 44: Changing the Gauge Display

6.2 Fuel Management Page

To customize fuel management page:

1. Repeatedly press Key 1 to access the Fuel Management page.
2. Press and hold down Key 2 to **RESET TRIP FUEL**. This will reset the **Trip Fuel Used** data to 0.
3. Press and hold down Key 3 to **RESET ALL FUEL**. This clears and resets all the counters - Fuel **Used** including **Port, Starboard, Centre, and Total.** Holding down Key 3 will also clear the **Trip Fuel** counter.

Figure 45: Fuel Management Page

7 Managing Alarms

SMX DigitalView has a built-in alarm feature that provides visible alarms and warnings when any performance parameter falls below a threshold or exceeds the permissible upper limit.
When an alarm is active, an icon that represents a parameter will flash in red along with a popup warning message in red.

Figure 46: DigitalView Performance Alarm and Warning

The Alarms menu is active only if there are any active alarms that have not been viewed and/or suppressed.

The currently supported alarms are:

- Low Oil Pressure Alarm of 10 PSI
- High Coolant Temperature of 203^0 F
- *Low Fuel Level of 10%

To manage alarms:

1. Press key 4 to view the **Alarms** screen.
   The alarm suppression screen appears.

Figure 47: Viewing and Suppressing an Alarm

2. Press Key 1 or Key 2 to scroll and view the active alarms.
3. Press Key 4 to suppress an active alarm.
4. Press Key 5 to return to the main DigitalView interface.

8 About

The About page gives software version information and units (Software) serial number.

Figure 48: About DigitalView

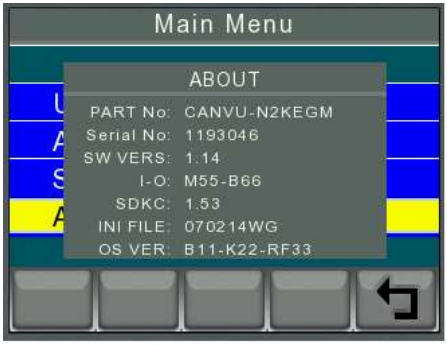

Figure 49: Product Details

9 Glossary

Term/Phrase	Definition/Description
CANbus	Controller Area Network bus is a standard that allows microcontrollers and devices to communicate with each other within a vehicle, without any host computer.
COG	Course Over Ground is the actual path of a vessel with respect to the seabed, measured in degrees.
ECU	Engine Control Unit is a type of electronic control unit that controls a series of actuators on an internal combustion engine to ensure optimal engine performance.
DigitalView	Engine Gateway Monitor is a 3.5” display with integrated input and output features.
J1939	J1939 is an engine data protocol that runs over the industrial CANbus and is used to exchange data between two engines.
Micro Controller Unit	Micro Controller Unit is a chip that contains the processor, ROM, RAM, and an I/O control unit.
NMEA	National Marine Electronics Association (NMEA) 2000 is the standard for serial data networking of marine electronic devices.
Non-electronic engine	Non-electronic engine is an engine that is not controlled by an ECU / ECM. It is also termed as “Mechanical Engine” or "Non-ECU Engine”.
SOG	Speed Over Ground is the speed of the vessel relative to the surface of the earth.

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